# 2010 White House Closing the Circle Awards
# Department of Energy Pollution Prevention Star Awards

The Department of Energy, National Nuclear Security Administration (NNSA) has announced the 2010 Pollution Prevention (P2) Award winners and the Los Alamos National Laboratory (LANL) once again led NNSA in the number of awards received. The winning projects were completed in FY 09. LANL won four awards, two in the Best-in-Class categories for Waste Reduction/Pollution Prevention and Sustainable Building and two Environmental Stewardship awards for Electronics Stewardship and Alternative Fuels.

The 2010 P2 Best-in-Class Award for Sustainable Building was awarded to the Chemistry and Metallurgy Research Replacement (CMRR) Project, Radiological Laboratory/Utility/Office Building (RLUOB). The award ceremony and presentation will be held sometime in FY 2010.

As is evident in the following nomination that was submitted for award consideration, this project not only helped improve environmental performance during construction, it also will enhance safety and security and reduce the long term cost and risk to LANL operations.

## NOMINATION

**Award Category:** Sustainable Design/Green Buildings

**Nominee(s):** CMRR Project Core Engineering, Procurement, Construction, and Environmental Compliance Teams

**Title:** RLUOB Integrated Planning, Design, Procurement, and Construction

**Nomination Abstract:**

The Chemistry and Metallurgy Research Replacement (CMRR) Project, Radiological Laboratory/Utility/Office Building (RLUOB) consists of approximately 19,500 square feet radiological laboratory space, centralized utilities/services for the RLUOB and future Nuclear Facility, office space for 350 workers, consolidated training facility with mock laboratories, and facility incident command and emergency response capabilities.

Sustainability considerations were integrated early in the CMRR Project planning and design phases. A strong commitment to environmental stewardship was maintained throughout the procurement and construction process to ensure the final product results in a high-performance sustainable building.

The RLUOB is anticipated to be awarded U.S. Green Building Council (USGBC) Leadership in Energy & Environmental Design (LEED®) for New Construction Silver Certification and will be the first building at LANL to register and participate in the formal process to achieve LEED certification. LEED certification at any level would be considered a challenge, given the RLUOB's mission and functional performance requirements for safety and security. RLUOB is not the typical type of building for which LEED certification is attempted.

Concepts and strategies implemented on the CMRR Project to achieve sustainability goals and commitments include the following:

- Integrated Planning, Design, Procurement, and Construction
- Sustainable Site Selection and Development
- Water Efficiency
- Optimized Energy Performance
- Reduced Environmental Impact of Materials and Resources
- Enhanced Indoor Environmental Quality

**Nomination Description:**

**Integrated Planning, Design, Procurement, and Construction -** In 2004, the decision was made to use the LEED® third party rating system to document the high performance sustainable design considerations and measure the level of sustainability achieved by the building. This decision was made four years prior to establishment of Department of Energy (DOE) Order 430.2B LEED requirements. In 2005, RLUOB was registered under the LEED for New Construction (LEED-NC) Version 2.1 rating system.

In 2005, the design/build subcontract was awarded with a specific requirement to achieve LEED Silver Certification. Performance specifications in the subcontract identified requirements for environmentally preferable products such as compliance with Environmental Protection Agency Comprehensive Procurement Guidelines for Products Containing Recovered materials and identification of materials that contain low concentrations of volatile organic compounds.

An orientation to LEED concepts and strategies is provided to all CMRR Project team members, regardless of their area of discipline or project responsibility. In-depth training was provided to the Start-Up & Commissioning team on specific prerequisites and attempted credits. Several team members have achieved the designation of LEED Accredited Professional including the Environmental Compliance Manager, LEED Coordinator, Construction Manager, Subcontract Technical Representative, and Project Controls staff. These LEED APs review day-to-day construction activities and review various construction submittals to ensure environmental commitments are met.

Lessons learned during RLUOB design and construction activities are already being applied to other LANL projects including the future Nuclear Facility. CMRR Project staff participate in monthly meetings with LANL staff from other programs and projects (e.g., Institutional Site Planning and Design Engineering) to share success stories and evaluate opportunities to improve LANL processes, such as modifications to LANL master performance specifications to ensure LEED documentation requirements are addressed.

Substantial completion of the first phase of the RLUOB was achieved in September 2009. The Project has begun the process to submit to the USGBC and its certification organization required LEED letter templates and supplemental documentation for design and construction prerequisites and attempted credits.

**Sustainable Site Selection and Development –** The RLUOB was sited at a pre-developed location adjacent to programmatic facilities it will serve in an area that meets LEED sustainable site requirements. The site has been designed to minimize site development area and restore open space with native vegetation. Regional, local, and LANL comprehensive transportation management initiatives such as commuter trains and busses, bicycle storage, and designated car/vanpool parking provide valuable alternative transportation resources for LANL workers. Over 93% of the RLUOB roof is constructed with highly reflective roofing material that minimizes the heat island affect to adjacent facilities and land. (LEED-NC requires a minimum of 75% roof area for two credits.)

**Water Efficiency -** Low-flow faucets, shower-heads and toilets installed in non-radiological areas will result in over a 30% reduction in water use over the life of the building. Further, planting of native/adapted species without permanent irrigation will result in significant potable water use reduction.

**Optimized Energy Performance** – The energy model developed for the RLUOB shows an approximate 16% reduction (by cost) from a baseline building established in accordance with ASHRAE 90.1-1999, *Energy Standard for Buildings Except Low-Rise Residential Buildings*. This level of energy optimization is a result of various design considerations and construction material selections such as building envelope design (orientation, materials, penetration seals, insulation); use of high efficiency gas fired hot water boilers, air cooled chillers, thermal storage systems, and variable frequency drives for compressors, fans, pumps; installation of energy efficient lighting (interior, exterior, process, task); and installation of highly reflective roofing material.

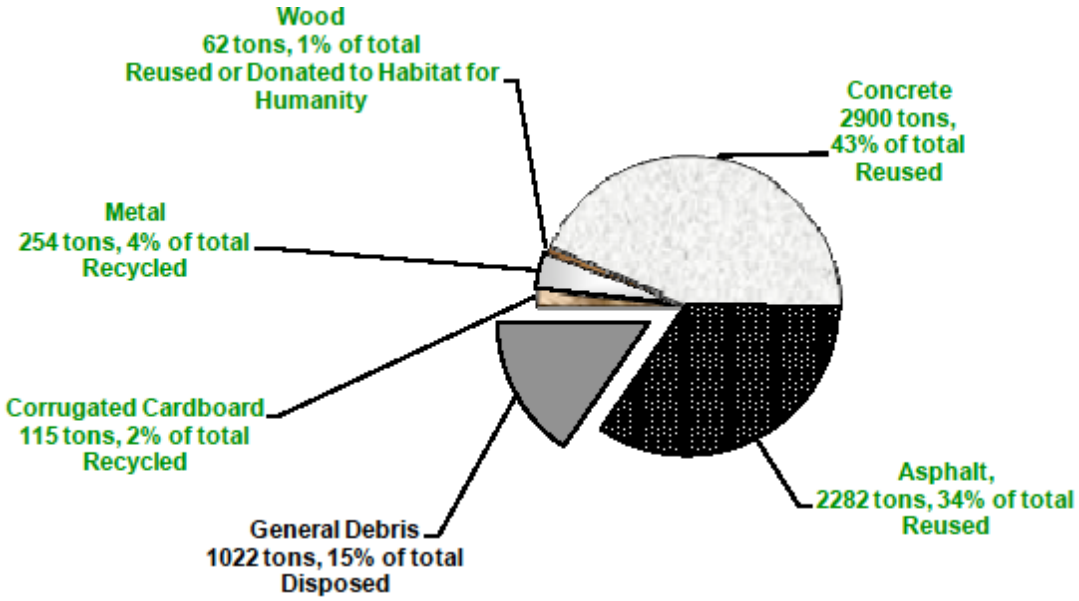
Additional indirect energy reductions are realized by using no potable water for landscaping and low-flow fixtures (less energy to pump groundwater), materials with recycled content (less energy to extract, process, and transport raw materials), regional materials (within 500 miles, less energy to transport), comprehensive transportation management (regional transportation access to commuter trains and buses and encouraging car/vanpools via designated parking).

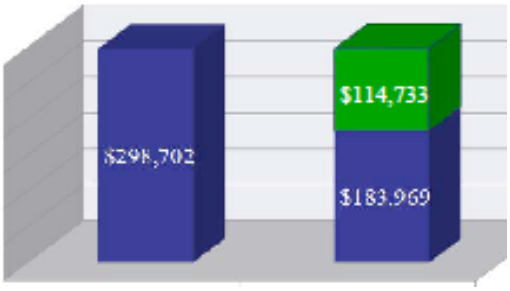
**Reduced environmental impact of materials and resources –** Construction waste diversion and the use of products with recycled material content, as well as other strategies such as requiring local/regional materials, and Forest Stewardship Council certified wood products all contribute to reduced environmental impact.

- **Construction Waste Diversion** – Through September 2009, approximately 85% (by weight) of RLUOB construction waste including concrete, metal, corrugated cardboard, wood, and asphalt were recycled or reused and thereby diverted from disposal in landfills. Some excess concrete was reused on-site as storm water best management practices (BMPs) to control sedimentation and soil erosion. The remaining concrete was collected by a Northern New Mexico construction firm or the Los Alamos County Eco Station for reuse as clean fill on local projects. Metal and cardboard were recycled off-site. During initial site preparations, trees and shrubs were processed into mulch for reuse

on-site as a storm water BMP for dust control. Used wooden concrete forms were donated to Habitat for Humanity ReStore to support their affordable housing construction initiatives. Asphalt was stockpiled for reuse as base mat on-site or used at other LANL projects.

**Construction Waste Diversion Status May 2007 through September 2009**




**6,638 tons Total**
**5616 tons, 85% Waste Avoided by Reuse or Recycle**
**1022 tons, 15% Waste Disposed as General Debris**
**38% Cost Savings**

The waste diversion effort has resulted in an estimated $114,733 cost savings considering only the cost reduction for recycling ($10 to $29/ton depending on the material) versus landfill disposal ($45/ton for debris waste). This does not include cost savings for avoiding procurement of new materials and associated reduced demand for virgin resources or reduced environmental impacts associated with resource extraction, processing, and transportation. Savings to the community by making these materials available for their recycle/reuse or available landfill space retained is also not factored in the estimated cost savings.

This high level of construction waste diversion was accomplished by performing the following actions:

- Prior to construction, development of a construction waste management plan that identified potential waste streams, recycle/reuse pathways and goals
- Educating the various lower-tier subcontractors on the plan and methods to implement the plan
- Establishing a dedicated space on site for unused/excess material available for potential re-use
- Designating a segregation area on site for materials with no further use potential
- Designating a trained person to perform on-site material segregation into separate labeled containers
- Verifying materials are properly segregated to ensure wastes are minimized
- Generating a monthly waste management report to track materials by type, weight and disposition (e.g., recycled, reused, disposed)

Further, the waste management reporting process was evaluated as part of a Lean Six Sigma Process Mapping Project. This resulted in reduced processing times, thereby improving waste management decisions such as how to respond to changes in recycle/reuse material markets or the need to retrain certain subcontractors in appropriate waste management practices.

- **Recycled Material Content –**Materials that contribute to the RLUOB recycle content goal of 10% include: concrete – poured in place and pre-cast panels; steel beams, wall panels, plates, wire, and rebar; metal wall framing and studs; sheetrock; ceiling panels; fireproofing; insulation; and glazing.

**Products with Recycled Material Content**

**Steel beams, wall panels, plates, wire, rebar**

**Concrete poured in place, pre-cast panels**

**Wall framing and studs**
**Sheetrock**
**Ceiling panels**
**Fireproofing**
**Insulation**
**Glazing**

**Enhanced Indoor Environmental Quality –** A construction indoor air quality management plan was developed and implemented that included protecting heating, ventilation, and air conditioning (HVAC) equipment and duct by covering with plastic while in storage and after installation until the building is complete. Filters were installed to trap particulates during construction, which will be replaced prior to beneficial occupancy. Specification and installation of low-emitting materials such paints, carpets, flooring, adhesives and sealants was performed to reduce construction worker and occupant exposure.

**Example HVAC Components Covered to Minimize Particulates in Completed System**